

PATENT SPECIFICATION

434,907

Application Date : Oct. 1, 1934.

No. 28048/34.

Complete Specification Accepted : Sept. 11, 1935.

EXAMINER'S

COPY

Div. 32



COMPLETE SPECIFICATION

Improvements in or relating to Radiators for Cooling Liquids, particularly for Motor Road Vehicles

I, ETTORE BUGATTI, an Italian Subject, of Molsheim, Bas-Rhin, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to tubular radiators for cooling liquids, particularly for motor road vehicles.

Generally speaking, it has been known for a long time to provide restricted openings for the inlet of water into water tubes of surface condensers, while maintaining a high pressure in and throughout the inlet water chamber or header, with a view to ensuring an even distribution of cooling water amongst the various tubes of the condenser. More recently it has been proposed to provide one or more restrictions in the detachable tubes of radiators, for instance by pushing into the inlet end and soldering thereto a channel-shaped washer.

According to this invention, the tubular radiator has its inlet header provided internally with a closed distributing chamber adapted in operation to receive water, and to discharge it into the tubes through individual jets or calibrated orifices, the cross-section of the latter being so selected as to cause a slight increase of the water pressure in said distributing chamber. The increase of pressure is constant throughout the distributing chamber, thus ensuring a constant output from each jet or calibrated orifice. Consequently the cooling tubes are caused to radiate the same amount of heat individually.

Moreover, in accordance with this invention the jets are preferably disposed so as to protrude from the distributing chamber into the inlet part of the tubes. Holes or slots may be provided in the top part of the tubes to allow for water from the header to pass into the tubes.

The calibrated orifices or jets are preferably of rounded form to facilitate the flow of liquid.

If desired, the cross section of the orifices may not all be similar; in this manner the output of certain tubes or

certain rows of tubes may be greater than others, in order to take advantage of their position relatively to the flow of cooling air: in this connection it may be pointed out that in a radiator cooled by air, e.g. in a road vehicle radiator, the cold air impinges directly on the front tubes which are thus subjected to greater cooling than the tubes in rear of them; in the case of a fan the same remark applies to tubes located in proximity to the fan.

The total output of the radiator can thus be increased by causing each element to operate under conditions which permit of taking advantage of its maximum output.

A further advantage of this distributing chamber is as follows: when occasionally the level of the cooling liquid falls below the point of inlet of the cooling tubes when the latter are arranged vertically, or to such a point that certain tubes are empty when they are arranged horizontally, the feed of liquid with the normal system takes place only in a restricted number of tubes, that is to say the tubes situated in proximity to the liquid inlet in the case of a radiator with vertical tubes or with the lower tubes in the case of a radiator with horizontal tubes. This drawback, which is adapted to diminish the output of a radiator, is completely eliminated in accordance with the present invention, because each tube receives its quantity of liquid independently of the quantity of liquid in the radiator, which ensures satisfactory cooling even in unfavourable circumstances.

The following description read in connection with the attached drawings, which are given by way of example, will enable the manner in which the invention is to be carried out to be understood.

Figs. 1 and 2 represent, in partial vertical section, two different conditions of operation of the radiator.

Fig. 3 is a section on a larger scale of a detail.

The radiator with vertical tubes as illustrated has a large upper collecting chamber 1 with a filling neck 2 and gilled tubes 3. These tubes communicate with

[Price 1/-]

the interior of the chamber 1 by holes or slots 4 and receive cooling water through calibrated openings or nozzles 5. This water has been led from the engine through a pipe 6 into a chamber 7 to the walls of which the nozzles 5 are connected or with which they are integral.

When the quantity of water in circulation is insufficient, the tubes 3, see Fig. 2, are not entirely filled but they all contain the same quantity of water, or if desired different quantities of water but of which the distribution conforms to a predetermined requirement.

The tubes instead of being vertical, may be either horizontal or inclined; in such case the inlet header or collecting chamber 1 might be either vertical or inclined, remaining substantially perpendicular to the tubes as in Fig. 1, its filling neck 2 being of course disposed at the proper place; also the internal distributing chamber although being, in principle, mounted as shown, would be, at need, given a slightly different shape.

It is obvious that modifications of detail could be introduced into the radiator described without departing from the spirit of the present invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same

is to be performed, I declare that what I claim is:—

1. A tubular radiator for cooling liquids, in which the inlet header is provided internally with a closed distributing chamber adapted, in operation, to receive water and to discharge it into the tubes through individual jets or calibrated orifices, the cross-section of the latter being so selected as to cause a slight increase of the water pressure in said distributing chamber.

2. A tubular radiator according to Claim 1, in which the jets are disposed so as to protrude from the distributing chamber into the inlet part of the tubes.

3. A tubular radiator according to Claim 2, in which holes or slots that open in the inlet header are provided in the top part of the tubes for the purpose set forth.

4. A tubular radiator constructed substantially as shown in and described with reference to the accompanying drawings.

Dated this 1st day of October, 1934.

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1856

May provide
holes in top
part of tubes
to allow water
in headers to
enter tubes

Fig: 1

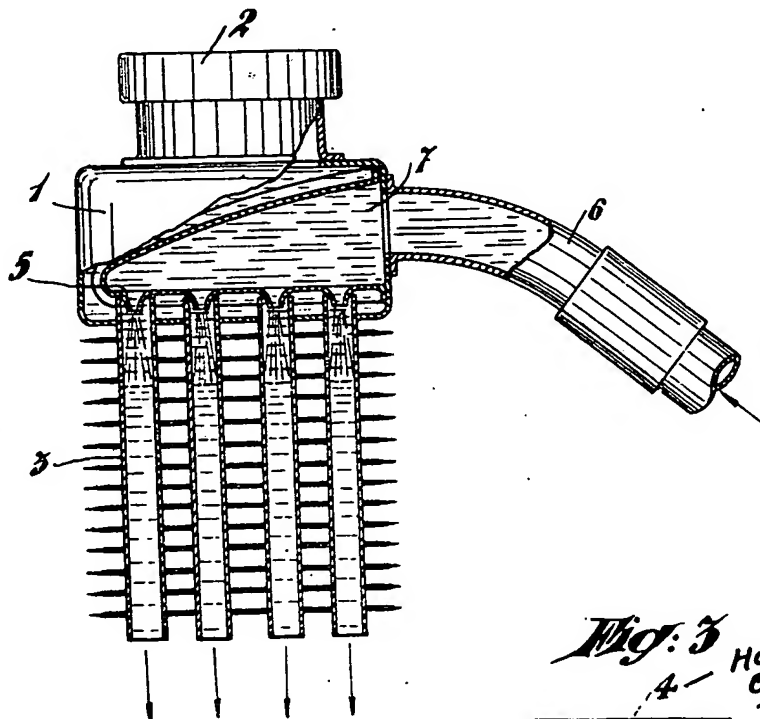
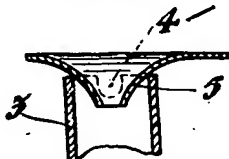


Fig: 3



HOLES
COMMUNICATE
TUBES WITH
HEADER

Fig: 2

SIZE OF
HOLES
MAY BE
VARIED

